The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated March 7, 2006 (U.S. Patent Office Paper No. 20060206). In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

As outlined above, claims 5-19 stand for consideration in this application, wherein claims 1-4 are being canceled without prejudice or disclaimer, while claims 5 and 8-11 are being amended to correct formal errors and to more particularly point out and distinctly claim the subject invention. All amendments to the application are fully supported therein. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

35 U.S.C. §102(e) rejection

Claims 1-4, and 11-13 were rejected under 35 U.S.C. §102(e) as being anticipated by Abeta et al (US6,647,003). As mentioned above, claims 1-4 are being cancelled, and therefore the rejections of claims 1-4 are moot. Applicants respectfully traverse the rejection of claim 11-13 for the reasons set forth below.

According to the M.P.E.P. §2131, a claim is anticipated under 35 U.S.C. §102 (a), (b), and (e) only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.

Claim 11

The Office Action contends that Abeta teaches a receiving apparatus in a mobile communication system (CDMA transceiver and 620 receiver), a channel estimator for estimating the channel variation between a transmitting apparatus and the receiving apparatus in accordance with a received signal, a detector for detecting the received signal in accordance with an estimation result produced by said channel estimator; and a demodulator for demodulating said detected received signal, wherein said received data signal includes a

plurality of data symbols; wherein said channel estimator operates at a data symbol rate of said received data signal to perform channel estimation for each data symbol; and wherein said detector detects said received data signal for each of said data symbol. Applicants respectfully disagree.

Abeta is directed to a channel estimation unit, a CDMA receiver and a CDMA transceiver with the channel estimation unit. However, Abeta merely shows that channel estimation of the data symbols are obtained by calculating a weighted sum of averages of <u>the pilot symbols in the individual pilot blocks</u> and channel fluctuations in the data symbol sequence in each pilot block is compensated by using the channel estimates of the data symbols. In other words, in Abeta, channel estimation is performed <u>for each block which includes a plurality of pilot symbols</u>.

In contrast, the present invention as recited in claim 11 provides that the channel estimator is configured to perform <u>channel estimation for each data symbol</u> and the channel estimator operates at a data symbol rate of the received data signal. Thus, the present invention enables the obtaining of a different channel estimation for each one of the data symbols in a data signal.

Therefore, Abeta does not show every element recited in claim 11. Accordingly, claim 11 is not anticipated by Abeta.

Claims 12-13

As to dependent claims 12-13, the arguments set forth above with respect to independent claim 11 are equally applicable here. The base claim being allowable, claims 12-13 must also be allowable.

The First 35 U.S.C. §103(a) rejection

Claims 8-10 and 19 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Abeta in view of Dent (US 6,507,602). This rejection is respectfully traversed for the reasons set forth below.

According to the Manual of Patent Examining Procedure (M.P.E.P. §2143),

To establish a prima facie case of obviousness, three basis criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the

reference or to combine reference teachings. Second there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both not found in the prior art, not in the applicant's disclosure.

Claims 8-10

The Office Action contends that Abeta does not teach additional limitations recited in claims 8-10; however, Dent teaches these limitations, and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Abeta with the limitations of Dent in order to embody all the features of the invention as recited in claims 8-10. Applicants respectfully disagree.

A distinctive feature of the present invention as now recited in claim 5, upon which claims 8-10 depend, among other features, is that the receiving apparatus estimates a data signal channel condition for each data symbol of said received data signal, and detects said received data signal for each of said data symbol in accordance with the estimation result.

As set forth above, Abeta does not show or suggest this feature. Dent shows that a receiving apparatus comprises a receiver receiving signals via multiple propagation paths having different propagation delays and converting the signals to digital samples for processing. However, Dent says nothing about the above-mentioned feature recited in claim 5.

Furthermore, there is no suggestion or motivation in either Abeta or Dent to combine these features explicitly or implicitly, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 5, upon which claim 8-10 depend. Accordingly, claims 8-10 are not obvious in view of all the prior art.

Claim 19

As set forth above, Abeta does not show or suggest the feature as now recited in claim 11, upon which claim 19 depends, namely that the channel estimator is configured to perform channel estimation for each data symbol and the channel estimator operates at a data symbol rate of the received data signal. Furthermore, Dean says nothing about this limitation.

Furthermore, there is no suggestion or motivation in either Abeta or Dent to combine these features explicitly or implicitly, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the

invention as recited in claim 11, upon which claim 19 depends. Accordingly, claim 19 is not obvious in view of all the prior art.

The Second 35 U.S.C. §103(a) rejection

Claims 5-7 and 14-18 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Abeta in view of Dent in further view of Ling (US 5,737,327). This rejection is respectfully traversed for the reasons set forth below.

Claim 5

The Office Action contends that Abeta teaches pilot and data symbols except that Abeta fails to teach that the sampled pilot signal is interpolated into the symbol rate of said data signal using an FIR filter operating at the symbol rate of said data signal and entered into the FIR filter and pulses. The Office Action further contends that Ling teaches the sampled pilot signal is interpolated into the symbol rate of said data signal using an FIR filter operating at the symbol rate of said data signal and entered into the FIR filter and pulses, and that it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Abeta with the limitations of Dent in order to embody all the features of the invention as recited in claim 5. Applicants respectfully disagree.

As set forth above, Abeta and Dent does not show that the receiving apparatus estimates a data signal channel condition for each data symbol of said received data signal, and detects said received data signal for each of said data symbol in accordance with the estimation result.

Ling is directed to a receiver circuit receiving a spread spectrum communication signal such as a DS-CDMA signal including a pilot channel and a power control designator. Ling, however, does not show the above-mentioned feature that Abeta and Dent fail to show.

Furthermore, there is no suggestion or motivation in either Abeta, Dent or Ling to combine these features explicitly or implicitly, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 5. Accordingly, claim 5 is not obvious in view of all the prior art.

<u>Claims 6-7</u>

As to dependent claims 6-7, the arguments set forth above with respect to independent claim 1 are equally applicable here. The base claim being allowable, claims 6-7 must also be allowable.

Particularly, regarding claim 6, the present invention provides that the coefficient of said FIR filter is determined in accordance with an impulse response, which is determined by a Fourier transform of predetermined low-pass characteristics.

In contrast, Abeta merely describes that it is preferable to increase the weights α (n_i) of the pilot blocks that include pilot symbols closer (closer in time) to the nth pilot symbol. (Fig. 3 col. 8, lines 9-15) However, Abeta does not precisely show a method of determining the weights.

Dent shows slow moving receivers, such as hand-held receivers, could have considerably more slowly changing rays in which it would be desirable to filter more narrowly. (symbols 42 and 44 in Fig. 2, col. 10, lines 18-21). However, in Dent, a filter changes rays in a frequency domain, while the filter in the present invention, namely, FIR filter applies in a time domain. Therefore, the nature of filtering in Dent is completely different from that in the present invention.

Ling shows that a receiver circuit has a low pass filter (IIR filter or FIR filter) in a channel estimator, but does not describe a characteristic of the low pass filter and a method to determine coefficients of the low pass filter.

Therefore, there is no suggestion or motivation in either Abeta, Dent or Ling to combine these features explicitly or implicitly, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to embody all the features of the invention as recited in claim 6. Accordingly, claim 6 is not obvious in view of all the prior art.

<u>Claims 14-18</u>

As set forth above, Abeta, Dent, and Ling do not show the limitation recited in claim 11, upon which claims 14-18 depend, namely that the channel estimator is configured to perform channel estimation for each data symbol and the channel estimator operates at a data symbol rate of the received data signal. Furthermore, there is no suggestion or motivation in Abeta, Dent or Ling to combine these features explicitly or implicitly, or in the knowledge generally available to one of ordinary skill in the art at the time the invention was made to

embody all the features of the invention as recited in claim 11, upon which claims 14-18 depend. Accordingly, claims 14-18 are not obvious in view of all the prior art.
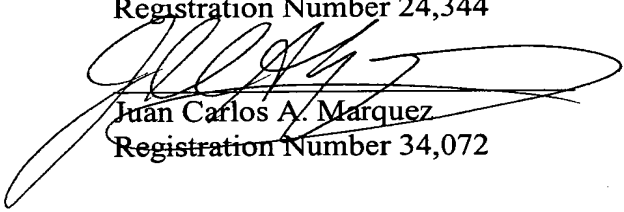
Conclusion

In view of all the above, Applicants respectfully submit that certain clear and distinct differences as discussed exist between the present invention as now claimed and the prior art references upon which the rejections in the Office Action rely. These differences are more than sufficient that the present invention as now claimed would not have been anticipated nor rendered obvious given the prior art. Rather, the present invention as a whole is distinguishable, and thereby allowable over the prior art.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicant's undersigned representative at the address and phone number indicated below.

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